

QP Code : MV-20184

(3 Hours)

[Total Marks: 100]

- 1) Question No.1 is compulsory
- 2) Attempt any four questions out of remaining Six questions.
- 3) Assume any data wherever required but justify the same.
- 4) Figures to the right indicate full Marks.

1.
 - (a) Explain the properties of random numbers 05
 - (b) Define the following terms – 05
(I) Activity (II) System (III) Simulation (IV) Delay (V) Model
 - (c) If the interarrival time ranges from 2 to six minutes with equal probability and random digits generated are 51, 27, 63, 89, 11 and 45. Generate FEL with primary events. 05
 - (d) Explain Time series input model. 05
2.
 - (a) Explain the steps in simulation study. 10
 - (b) Distinguish between:- 10
 - i) Terminating and non-terminating simulation.
 - ii) Endogenous and exogenous event
 - iii) Random numbers and random variates.
3.
 - (a) Describe the characteristics of queuing systems. Name and explain some of the useful statistical models for queuing system. 10
 - (b) Explain inventory system. Discuss the cost involved in inventory systems. 10
4.
 - (a) Describe the procedure to generate samples from :- 10
 - i) Erlang distribution
 - ii) Exponential distribution
 - (b) Write down the steps for K-S test. The sequence of numbers 0.54, 0.75, 0.98, 0.12 and 0.68 has been generated. Use K-S test with $\alpha = 0.05$ to learn whether the hypothesis that the numbers are uniformly distributed on the interval [0,1] can be rejected. (Critical value $D_{\alpha} = 0.565$) 10
5.
 - (a) What do you understand by model verification and validation? Describe Briefly the various methods of validating input model 10
 - (b) Describe initialization bias in steady-state simulation. 10
6.
 - (a) Test the following random numbers for independence by runs up and down test. 10
Take $\alpha = 0.05$ and critical value $Z_{0.025} = 1.96$

[TURN OVER]

(0.12, 0.01, 0.23, 0.28, 0.89, 0.31, 0.64, 0.28, 0.33, 0.93)

(b) What are the methods used to generate random numbers?

10

7. Write short notes on (any two) :-

(2x10)

20

- a) Cobweb Model
 - b) Selection of a simulation software
 - c) Manufacturing system simulation
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